

THE SNOOK-HERR POISONING.

(From American Practitioner and News, April 25, 1891.)

THE OFFICIAL INVESTIGATION—PRELIMINARY EXAMINATION.

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On Wednesday, the 15th inst., there occurred at Lyndon Station, some eight miles east from Louisville, a wholesale poisoning with terribly tragic and mysterious character and consequences. The occasion was a wedding, upon which some eighty guests attended. Of these, seventy were taken in from four to sixteen hours with violent and persistent vomiting or purging (or both), attended with great prostration in all and collapse in some cases. Death was the result in six cases, and it is not certain that more will not follow. The event is still shrouded in mystery, physicians and toxicologists being in doubt as to the offending agent.

The following from Dr. H. M. Goodman, Demonstrator of Medical Chemistry and Bacteriology, University of Louisville, contains about all that has come to light with reference to the affair at this writing:

CHEMICAL LABORATORY OF THE
UNIVERSITY OF LOUISVILLE, April 19, 1891.

Salad—Inspection: A careful examination of the vessel and its contents failed to show the presence of any gritty substance. The salad was composed of chicken, celery, olive oil, mustard, salt and pepper, and chicken broth mixed with it.

Chemical Tests: A portion of the salad was mixed with distilled water, to which was added one half part of pure hydrochloric acid, and the whole boiled for one hour. This was then filtered and subjected to the following tests:

For Arsenic—Reinsch's Test: Absolutely no deposit on the copper strips after one half hour of continuous boiling. The strips, thoroughly

dried and placed in the reduction tube, formed no sublimate.

Marsh's Test: New Generator.

Precautions: Pure zinc, distilled water, C. P. sulphuric acid, thorough cleanliness. The gas was allowed to form for fifteen minutes, during which time the porcelain plate was used to prove the purity of the materials, and no spot formed. One half ounce of the concentrated filtrate was now added to the contents of the generator, and fifteen or twenty plates were used at intervals of from one half to one minute, but not a single spot was obtained, proving the absence of arsenic and antimony.

A fresh portion of the salad was taken and thoroughly mixed with pure hydrochloric acid, and the mixture boiled for one hour, filtered, and subjected to Reinsch's test. Result absolutely negative. Bearing in mind that other metals, namely, antimony, mercury, silver, tin, gold, bismuth, and palladium will also form a coating on the copper strips, in the absence of any deposit whatever, I think we can safely exclude these substances. A source of error may also arise from the fact that the presence of complex organic substances, especially when they contain sulphur, will also form a coating on the copper strips, which, when placed in the reduction tube, will sublime and form grayish deposits, sometimes even in the form of acicular crystals (evidently a copper compound). Thus we can see how an incompetent observer may form a hasty opinion. Antimony and mercury are the other metals which sublime under the above circumstances, arsenic in the form of octahedral crystals, antimony as an amorphous sublimate, and mercury in the form of spherical globules. Therefore, for the complete corroboration of Reinsch's test for arsenic, antimony, or mercury, it is not admissible in medico-legal cases to state that a sublimate formed under the above circumstances is arsenic, unless

we can verify the characteristic octahedral crystals under the microscope and still further establish their identity by chemical tests. The delicacy of this test is such that the merest tyro in chemistry need have no difficulty in establishing the presence of arsenic in a suspected solution. One grain of arsenic dissolved in an acid solution is sufficient to coat three hundred and fifty square inches of copper plate.

A second portion of this filtrate was submitted to Marsh's test with the same precautions as yesterday, and it formed no deposit on the porcelain. A portion of the milk was concentrated and subjected to the following test:

1. Tr. ferri chloridi; no color.
2. Bichromate potassium and sulphuric acid;

no result.

Concentrated C. P. nitric acid; no color.

The electrolytic separation of copper was omitted, as the presence of any injurious quantity could be extracted with water and hydrochloric acid. This was done, and the filtrate tested with ferrocyanide of potassium, which gave no precipitate.

Phosphorus-hydrogen test; no result. The absence of cyanides and oxalates was shown by the general test for acid radicals.

Ptomaines. Stas-Otto Method: The salad was digested at a temperature of seventy degrees for four hours in ninety-per-cent alcohol, to which thirty grains of tartaric acid was added, and filtered. The filtrate was evaporated in a strong current of air at a temperature of 35°. Residue taken up in absolute alcohol, filtered, and again evaporated. This residue was dissolved in water, rendered alkaline with sodium bicarbonate, and agitated with ether. After separation the ether was removed and allowed to evaporate spontaneously. The residue was again dissolved in water agitated with ether, ether removed and again allowed to evaporate spontaneously, and this reserved for further experimentation.

A specimen of dejecta from a patient who died, passed on the second day, was sent by Dr. T. Anderson. It was mixed with pure hydrochloric acid, placed in retort and distilled. The distillate, subjected to Reinsch's test, gave no deposit on copper. Slips placed in the reduction tube formed no sublimate.

Specimen of urine from patient who died, passed on the second day. This was also sent by Dr. Anderson. Concentrated to one third its original bulk and filtered, acidulated with hydrochloric acid, and subjected to Reinsch's test, gave no deposit on copper slips. Slips placed in the reduction tube gave no sublimate. A specimen of milk was boiled with an equal part of hydrochloric acid and filtered. Reinsch's test applied to this specimen gave no deposit. Slips in reduction tube gave no sublimate. Marsh's test was applied to the remaining portion of this specimen. Results negative.

General Separation for Metals. A portion of the milk, filtered and tested with litmus paper, showed a marked acid reaction.

1. To the greater portion of the filtrate some hydrochloric acid was added. No precipitate found. This excludes lead, silver, and mercury.

2. In the absence of a filtrate forming under test (1) the solution was next boiled down to one half the original quantity, and then saturated with sulphuretted hydrogen gas, and no precipitate formed. A precipitate would have indicated mercury, lead, bismuth, copper, tin antimony, arsenic, gold, or platinum; consequently these metals can be excluded.

3. The solution was then boiled until it ceased to smell of sulphuretted hydrogen, a little strong nitric acid was added, the whole evaporated to dryness, and the residue gently ignited in the dish. After cooling, some strong hydrochloric acid was poured upon the residue and some distilled water added, and the undissolved residue filtered off. To a portion of the filtrate was added some molybdate of ammonia, and a precipitate formed, showing the presence of phosphates. This was examined under table (3), and proved to be magnesium and calcium, excluding alumina, iron, and chromium.

4. To the filtrate was added some sulphide of ammonia, and no precipitate formed, excluding zinc, manganese, cobalt, and nickel. The investigation was stopped at this point, as it was not thought necessary to test for the metals of the barium and potassium groups. Absence of cyanides and oxalates was shown by general tests for acid radicals. Absence of morphine, strychnine, brucia, atropine, was shown by appropriate tests.

A specimen of the urine, from a patient who was very ill and who has since died, sent by Dr. Anderson, April 21, 1891. A portion of this specimen was concentrated to one third its original bulk and carefully tested by Reinsch's test. No deposit formed on the copper; copper strips removed, carefully dried and placed in a clean reduction tube. No sublimate formed, showing the absence of arsenic, antimony, and mercury.

Specimen of dejecta from a patient who was also very ill, and since has died, sent by Dr. Anderson, April 21, 1891. This was taken, placed in an evaporating dish, carefully dried over a water-bath, and then mixed with an equal amount of hydrochloric acid. This was placed in a glass retort and carefully distilled. The distillate, which would have contained arsenic as the terchloride, had any been present, was tested by Reinsch's test. No deposit on slips. Copper slips placed in the reduction tube gave no sublimate, showing absence of arsenic, etc.

Marsh's test: Materials and apparatus tested with ten saucers. No deposit formed, proving purity of materials. Five drams of the distillate were then placed in the generator and the flame tested from time to time with ten saucers. No deposit formed, thus proving the absence of arsenic or antimony.

For Cantharides: A portion of the salad was dried and digested in successive portions of ether until exhausted. The ethereal solutions removed by pipette, mixed together and filtered and evaporated until nearly dry, and the residue spread on oiled silk and worn on the skin of the forearm, failed to produce vesication.

For Vegetable Alkaloids: Another portion of salad was digested in water acidulated with sulphuric acid, and this was removed and the process repeated three times. The united extracts were evaporated on a water-bath and mixed with four volumes of alcohol and allowed to stand for twenty-four hours, cooled and filtered. The alcohol was then distilled from the filtrate. I then concentrated a portion of the aqueous extract and made some general tests for vegetable alkaloids, and failed to obtain any especial reactions. I did not go through the

separation with ether, benzine, and chloroform, because I did not think it necessary.

Microscopic examination of the two specimens of dejecta sent to me by Dr. Anderson showed granular debris, oil globules, mold fungi, bacteria, etc., but no crystalline substance.

Tyrotaxon. Some of the filtered milk was rendered neutral with sodium carbonate, agitated with ether (equal volume), allowed to stand in a glass-stoppered bottle for twenty-four hours, the ether removed and allowed to evaporate spontaneously in an open dish. The aqueous residue was acidulated with nitric acid, then heated with an equal volume of liquor potassium, and the whole concentrated on a water-bath at a temperature below 130° F.

The aqueous residue obtained from milk, after extraction with ether, was concentrated to one half its original bulk, and subjected to the following tests for ptomaines: Platinum chloride gave no precipitate. Gold chloride gave no precipitate. Potassio-mercuric iodide gave no precipitate. Ferric chloride and potassium ferro-cyanide gave no color. I failed to demonstrate the presence of tyrotaxon. The residue obtained from the salad, after extraction by the Stas-Otto method, gave the following reactions for ptomaines: Potassio-mercuric iodide a yellowish-white precipitate. Gold chloride a purple color. Platinum chloride a heavy yellowish-white precipitate. I do not know as yet what this substance is, as I am still experimenting with it, but I will state that one c. c. of it injected into the leg of a chicken killed it in three quarters of an hour.

As will appear from the above description of the methods used in the examination of such articles of food as came into my possession, as well as the discharges from several of the worst cases (both of whom died) that occurred after the fatal wedding, I have failed absolutely to demonstrate the slightest trace of arsenic or any other inorganic poison or vegetable alkaloid which would have produced symptoms similar to those that developed uniformly in all of the affected guests. The absence of mineral poisons being demonstrated, the question reduces itself to poisonous

Ptomaines or Mushrooms. Unfortunately I could not procure any of the latter, and the evidence to prove the cause of the poisoning must rest upon the question of what articles of food did most of the sufferers eat. I am perfectly well aware that the question will be asked: Suppose you did demonstrate the presence of ptomaines, what does that signify? Are not ptomaines more apt to develop the longer the food is kept, and does their mere presence in a toxicological examination necessarily mean that they were there at the time the food was eaten? A good many opinions have been expressed by physicians regarding the cause of the fatal illness, and some of them have been unwise enough to place themselves upon record as stating that it was undoubtedly due to this or that mineral poison. Certainly the evidence of a chemical analysis, with the corroborative clinical testimony, is a stronger proof than any *a priori* reasoning. Let us inquire a little more definitely into those mysterious agencies through which poisonous materials are sometimes formed during the process of putrefaction. "A ptomaine is a chemical compound, which is basic in its character, and which is formed during the putrefaction of organic matter. On account of their basic properties, in which they resemble the vegetable alkaloids, ptomaines are known as putrefactive alkaloids. They are often improperly spoken of as animal alkaloids; but this is incorrect, as some ptomaines are formed during the putrefaction of vegetable matter. Some ptomaines are highly poisonous, but the vast majority are wholly inert. Again, all poisonous substances formed during putrefaction are not ptomaines; for instance, phenol and hydrogen sulphide."

"Since all putrefaction is the result of the action of bacteria, it follows that all ptomaines result from the growth of these micro-organisms. The character of the ptomaine depends upon the bacterium engaged in its production, the nature of the soil, the temperature, the amount of oxygen present, and the duration of the process. It was formerly supposed that putrefaction was simply oxidation, but the researches of Pasteur and others have demonstrated that millions of germs are engaged in transforming organic into inorganic matter.

If organic matter be enclosed in sterilized, hermetically sealed cans, so that these little workers can not reach it, it will remain unaffected indefinitely."

Dr. Kastenbine's analysis of the spring-water and earth around the spring disproves the theory of arsenic or other mineral poison having been placed in the spring. The clinical history of over thirty cases obtained up to date shows that the salad was the one article of food that was alone responsible. This is fully borne out by the chemical analysis, which shows that the various articles of food analyzed by myself and Dr. Kastenbine were free from vegetable or mineral poisons, whereas I demonstrated the presence of putrefactive alkaloids and found immense quantities of bacteria in the salad, and also proved the milk free from tyrotoxicon. If I remember aright, the weather when the chickens were cooked and for the week following was extremely warm and sultry. We have here all the necessary conditions for the development of ptomaines: heat, light, an open vessel containing an animal broth. By the action of micro-organisms, which are to be found everywhere, fermentative changes were probably started in the broth and continued after its admixture in the salad. The symptoms of arsenical poisoning resemble in some respects those of poisonous ptomaines, but the difference is so marked in many respects that it is not so very difficult to distinguish between them. In arsenical poisoning the vomiting comes first; in acute cases the symptoms always appear within an hour, twenty minutes to one half hour being the rule time; in the subacute form the symptoms usually come on within an hour. In a few isolated cases the first appearance of the symptoms did not come on for six or eight hours. This of course depends upon the condition of the stomach, whether empty or full, or whether the person is addicted to the use of alcohol or morphine, but this delay is the exception, not the rule. It is not likely that twenty-five persons would uniformly have symptoms come on two or three hours later, up to eight hours, after all had partaken of food contaminated with arsenic. On the other hand, food contaminated with poisonous ptomaines and taken into the system is attended

by just such symptoms as developed in all the cases of which we have clinical records. The symptoms of ptomaine poisoning come on in four, six, or even eight to sixteen hours after ingestion of the poison. My own opinion, backed by the substantial clinical evidence and the negative evidence of a thorough chemical examination for mineral poisons, is that the source of the poison was a ptomaine which formed in the chicken broth during the interval that elapsed between the cooking of the chicken and the making of the salad, or that the chickens were diseased at the time they were killed, and that the admixture of the broth with the salad contaminated the entire mass, the process of fermentation continuing up to the time it was eaten by the guests.

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CLINICAL HISTORY.

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On May 15, 1891, there were present at a wedding, celebrated near Louisville, about eighty people, including the servants.

The company had lunch between two and three o'clock in the afternoon, and within twenty-four hours seventy of those who had eaten of it were taken violently ill. That some article or articles of food were poisoned was evident, but what the poison was was not known.

The opinion of several well-known physicians, publicly expressed, that the trouble was undoubtedly due to arsenic, was immediately accepted by the large mass of the people, and created a great deal of excitement, especially in the neighborhood where the tragedy occurred. The excitement rose to such a pitch that some so far forgot themselves as to mention the names of several whom they suspected of introducing the drug into the food.

The writer, having been called to the country to attend some of the sick, and appreciating the feeling which existed, and being convinced by a careful analysis of the symptoms of the cases in hand that the trouble was of fermentative rather than of mineral or other origin, made

the statement in the newspapers to that effect, believing that even should it prove to be wrong a good purpose would be served by checking criminal proceedings until a thorough investigation of the facts could be had.

This investigation was begun at once.

The lunch was served at 3 o'clock Wednesday afternoon, as follows: On the plate of each guest was placed a leaf of lettuce, a spoonful of chicken salad, a spoonful of mushrooms, olives, beaten biscuit, and a cracker; coffee, chocolate, ice-cream, and cake were served later. Water was drunk by nearly all. This water was originally from a spring near the house, this spring being five feet deep, six feet in diameter, and running in a continuous flow.

The cream used in the coffee and chocolate was from milk of that morning, and kept in the spring-house until used. The ice-cream and cake were made in the city. The mushrooms were of the best brand, six cans in number, and obtained from a reliable grocer. The biscuit, salad, and coffee were made on the place.

The salad contained chicken, celery, olive oil, vinegar, salt, pepper, and mustard. The celery had been kept in the spring-house. The chickens and turkey used were killed on Monday, the 13th, and cooked the same day in an iron boiler. Two of these chickens not being thoroughly done were left all night in the boiler and cooked again on Tuesday, but the others were removed on Monday night and put, with a small quantity of their own liquor, in a safe in the room adjoining the kitchen, where they remained until Tuesday morning, when they were picked to pieces by Bridget Cain, the cook. She separated the light from the dark meat and returned it all to the safe, where it remained until Wednesday, when the other ingredients of the salad were added.

Specimens of the water, dirt around spring, ham, biscuit, milk, and salad were obtained and divided between four competent chemists for analysis. No mushrooms could be gotten. The ice-cream, cake, coffee, and chocolate had been eaten by those not sick and untouched by many who were sick, so no analysis of them was necessary.

Inquiries were made in regard to exactly what substances were eaten by each individual who partook of this lunch, sick or well.

Of the eighty-one persons seventy were taken sick, while eleven escaped. None of the eleven ate salad or mushrooms, but did eat of all the other things. Quite a number of those sick did not eat mushrooms. Sixty-eight ate salad or chicken, the other two claiming that they ate none of it.

Seven cases of the sickness were seen by the writer and carefully examined, the symptoms being recorded at the time.

The symptoms presented were about the same in all, only differing in severity. The type of the milder form is shown in case first; that of the severer, in case second.

CASE 1. (Recovery.) Male, age twenty-three years, previous health not good. Symptoms came on eight hours after eating. There were at first slight cramps in bowels, soon followed by profuse watery, greenish stools; the bowels moved three times before vomiting occurred; the matters vomited were very sour. Fever (102.5° F.), attended with chilly sensations and burning of soles of feet and palms of hands soon developed; some pain, with a sense of weight, in the back and limbs. Tongue coated, lips parched, thirst intense, pupils normal, skin hot and dry, with no eruption; abdomen was swollen and slightly tender; urine diminished in quantity; blood in neither vomit, stools, nor urine; no paralysis, spasms, delirium, or coma.

CASE 2. (Death.) Adult, female, previous health very bad. Symptoms came on four hours after eating (the earliest on record). Commenced with cramps in bowels, soon followed by profuse, watery, dark green evacuations. Vomiting then set in and was excessive; the matters ejected were sour and offensive. Pain in bowels slight; urine diminished. Temperature 103.5° F. Skin was hot and dry; tongue foul; no eruption; no swelling of eyelids; no blood in vomit, stools, nor urine; no paralysis; no spasms, convulsions, delirium, nor coma.

After several day's sickness, the vomiting and purging continuing, the temperature became subnormal, the skin cold, clammy, and

cyanotic; breathing labored; pulse weak; delirium appearing just before death.

In order to make this report as complete as possible blanks were sent to the physicians in attendance on the the victims of this feast, and a report of their cases requested.

Dr. J. W. Irwin, of Louisville, and Dr. Mitchell, of Cincinnati, refused any information about their cases, but the reports were kindly sent in the other cases, sixty-three in number.

Fifteen of these cases were excluded, as they were manifestly full of inaccuracies. (That these reports were not excluded without just cause was shown at the coroner's inquest.)

From a comparison of the cases at my disposal it seems that the chill, high fever, nausea, vomiting and purging, the matters ejected being dark green in color, cramps in bowels, pain in limbs, burning and tingling of feet and hands, with intense thirst and prostration were very constant symptoms. Two cases developed fever blisters, and several showed erythematous splotches over face and chest. Headache was observed in some cases, but was not a constant symptom. Suppression of urine occurred in one fatal case. There was no swelling of eyelids, spasms, paralysis, nor coma; no eruptions except those enumerated above, due to the disordered stomach, were observed.

A number of theories were suggested in explanation of this distressing affair, among them that the spring was poisoned; that Paris green had been put in the water-cooler; that verdigris from copper vessels had caused the trouble, or that croton oil had been mistaken for olive oil in making the salad. Others said that arsenic or sulphate of copper had been mixed with the food, while still others believed that tyrotoxicon or decayed mushrooms were the cause.

The absurdity of the idea that the spring was poisoned will be appreciated by any one who will glance at its dimensions and the volume of water coming from it.

There were no copper vessels used in the preparation of this food, so that verdigris may be ruled out.

Paris green, with its well-known color and taste, besides being a very quick poison, is so

insoluble in cold water that any attempt to introduce it in that way would have been immediately detected.

Sulphate of copper has a metallic, styptic taste, and acts very promptly as an emetic. The symptoms were also entirely different from those produced by copper.

The theory that this was copper poisoning started in Cincinnati, and was suggested by the finding of a trace of copper in the liver of one of the victims, but as copper is found in the livers of persons in perfect health, no such deduction was justified.

Croton oil when taken internally immediately produces an intensely acrid sensation in the fauces, with heat, pain, and nausea when it reaches the stomach. This is soon followed by acute colicky pains and loose, watery stools. This was certainly not the condition here.

Tyrotrocon is easily ruled out, as many of those sick used no milk or ice-cream at all.

The arsenic theory was more plausible, but a differential diagnosis from symptoms alone should have been made, even in isolated cases.

In arsenic poisoning, symptoms in the large majority of cases come on within an hour or two—often within a few minutes.

An intense "fire-burning" pain in the stomach is the rule after arsenic, even when it is administered by the skin.

After arsenic nausea is intense, and the vomited matters contain a great deal of mucus and often blood, while the vomiting precedes purging, and is a more constant symptom.

The stools are dysenteric in character; in severe cases rice-water discharges are sometimes seen.

Abdomen retracted and tender to touch; pain increased by steady pressure.

Temperature at first normal or subnormal.

Pulse fast and weak.

Breathing labored.

Eyelids swollen and pupils dilated.

Cutaneous eruptions, usually papular or vesicular, are often seen.

In these cases no one was taken sick under four hours, while in some it was eighteen.

This delayed action occurring in seventy consecutive cases was enough of itself to rule out arsenic.

Here the pain was not very severe, and was colicky in its character.

Here there was great nausea, but the vomited matter was serous rather than mucous, and contained no blood. Purging preceded vomiting. Some persons while deathly sick required an emetic before they would vomit.

The discharges were dark green, offensive, and semi-fluid, like those seen in cholera infantum. No blood present.

Abdomen swollen; slightly tender; the pain relieved by steady pressure.

Temperature rose rapidly, and was in most instances preceded by a chill.

Pulse full and bounding.

Breathing slightly quickened, otherwise normal.

Both normal, except after administration of atropia.

Some redness of skin over face and chest in a few cases, due probably to disordered stomach, possibly to atropia. Fever blisters in two cases; a few boils in one, nothing distinctive of arsenic.

Spasms, paralysis, convulsions, and coma are often observed.

There was some weakness of all the muscles after the prolonged vomiting and purging, but here there was neither paralysis, convulsions, nor coma. (The one fatal case, which had suppression of the urine, became comatose before death; due to uremia.)

To recapitulate: After the administration of arsenic the symptoms come on quickly. These are nausea, vomiting, intense pain in stomach, diarrhea, burning of anus, thirst and constriction of throat.

Blood and bloody mucus pass by stomach and bowels. Urine may be suppressed and may contain blood. Patients soon show signs of shock and collapse. The skin becomes cold, clammy, and cyanotic; features are pinched; breathing labored; pulse fast and weak; temperature subnormal; pupils dilated, and eyes swollen.

Here, on the contrary, we had colicky pains coming on some hours after taking the poisonous food, followed by diarrhea, the stools being large, watery, dark green in color, and very offensive. Chills, high fever, burning of soles of feet and palms of hands, pulse and breathing quickened, skin hot and dry.

The symptoms of collapse seen late in some of these cases were due doubtless to the inspissation of the blood and collection of carbonic acid gas consequent upon the immense drain of serum which was taking place, and would be produced by any irritant capable of producing such a drain.

The intense thirst, which was a prominent feature in these cases, as in arsenic poisoning, was simply the call of nature to make up the great loss of water which was taking place by the bowel.

The difference between the symptoms in these cases and those poisoned by arsenic was so well marked that one physician who was called to the Herr residence on the night of the 15th, where fifteen were sick, stated that while he had gone there prepared to treat arsenic poisoning, after examining the patients he saw no reason for believing that that drug was the cause of the trouble, and so he gave no chemical antidote.

In making up this report it was my desire to simply present the facts in the case in a perfectly impartial way, and to avoid personalities,

but certain statements have been made in the public press and so persistently harped upon in private by advocates of the arsenic and mushroom theories, that it is impossible to ignore them and not leave the impression that they were borne out by the facts.

It has been stated that the salad analyzed by the chemists (three different specimens) was not the same as that served to the guests, and that even if it was the same, that it would not necessarily have contained the poison, as it might not have been thoroughly mixed.

That there was only one pan of salad made has been stated before, and this statement was made on the authority of the Herr family, backed by the written statement of the lady who prepared and served the salad.

Since seventy of the guests who were not looking for poison found it, it would seem reasonable to suppose that the mixing had been very thoroughly done, and that the three specimens of salad obtained by the gentlemen who were looking for poison, would have contained it.

Again, it was claimed that some persons only tasted the salad (which I will show later must have contained the poison).

This is a strong point against the mineral poison theory, although not so intended, for it will be found that these people were just as sick as those who ate a great deal, showing that the poison must have continued to generate after its introduction into the stomach, which would not have been the case with a mineral poison, where the effect is proportionate to the dose.

It was stated that arsenic was a very variable poison, and in this way was explained the difference of opinion expressed about these cases. This statement could only have been made by one who had gotten garbled and inaccurate accounts of the cases, for it would be difficult to find seventy cases of any disease which would show such slight variations as were seen here, and it would be practically impossible to find such a number of cases poisoned by arsenic and none of them show the ordinary signs produced by that drug. The advocate of the arsenic theory claims that his cases showed unmistakable signs of arsenic poisoning, and this,

taken in connection with his modified Reinsch's test, was perfectly conclusive. Wherein his four or five cases differed from the other sixty three I have been as yet unable to discover, although I understand that the doctor says that they did differ, and that he can furnish affidavits from his patients to that effect. I was sorry that I was unable to get a record of these cases, as it would have been interesting, and I have no doubt instructive, to have worked out the exact cause of their divergence from the rule. As the modification of the Reinsch's test done consisted in only doing the first part and omitting the last and most important steps of the test, no reliance can be placed upon it, as was shown by Dr. Kastenbine, whose ability as a chemist no one can doubt, he showing that the coating which was mistaken for arsenic contained no trace of that substance.

Lastly it was urged that the reason why no arsenic was found *post-mortem* was that it had been eliminated before death. This was a most excellent point, but unfortunately an analysis was made of the excreta of these very persons, taken when elimination would have been most active, and it failed to reveal a trace of the drug.

A great deal has been said about the treatment of these cases, and the claim made that those who had been treated for arsenic had recovered the most promptly.

What are the facts? From the evidence before the coroner's jury, and the reports from the physicians, which I have received, it appears that out of sixty-eight cases only seven received a chemical antidote to arsenic, and two of these not getting it until the second night; also that four, at least, of the fatal cases were diagnosed as arsenic poisoning. It must not be inferred from this that the cases so diagnosed fared worse than the others, for a careful study of the plan of treatment shows it to have been much the same in all the cases, the physicians differing much more in diagnosis than in treatment.

The plan which seemed most rational and most successful consisted in evacuating the stomach and bowels by emetics and purgatives, preferably warm water and mustard

and castor oil, or flushing with warm water, followed by morphia, atropia, digitalis, and whisky hypodermically, as indicated in each individual case. Bismuth and creosote were used by some with seeming benefit, but efforts to administer medicines or stimulants by the mouth seemed to the writer not only useless but but decidedly harmful in some cases, as they were almost immediately returned and only served to keep up the exhaustive retching.

Five of the six fatal cases were well advanced in years, and some of them also victims of antecedent disease which contributed no small share toward the fatal result.

The symptoms of sickness produced by decaying mushrooms (the poison being very similar) resemble so closely the symptoms in these cases that some other method than the study of symptoms is necessary to differentiate them.

The books of the grocer show the sale of six cans of mushrooms, brand "P. Pinard, Paris, Extra Choice," to Mr. A. G. Herr, on April 13th. The names of a number of persons using that brand, also the cheaper brand, and all without ill effect were furnished the writer. That no other mushrooms were taken out to the wedding is stated on good authority. These cans were opened on Wednesday morning, the mushrooms stewed in cream and served as before stated.

A number of persons afterward sick state positively that they ate no mushrooms, and while some allowance must be made for poor memories, it is not probable that so many were mistaken as to what they ate. Here it was urged that mushroom sauce was used over the salad which was eaten by the people; but as the salad was served cold and the mushrooms hot the absurdity of this is apparent. Added to this were the positive statements of the lady who made the salad and of those who ate it that no mushrooms or derivative of them were in the salad.

It was said by Dr. Kastenbine, in favor of his mushroom theory, that a cheap brand of mushrooms (seventeen and a half cents per can) had been used at the wedding, and that a can of mushrooms taken from this stock had been found in a state of decomposition; also that

mushroom sauce had been used in the salad, for he had found a few of their remains upon microscopical examination; that he had found the fungi in the fæces of one of the patients, and that the symptoms were altogether those of mushroom poisoning. That this cheap brand of mushrooms was not used, but the brand which I reported above, was proven by the bill of the goods which was produced, and by one of the empty cans which had been sent Dr. Kastenbine by Dr. Collins, of Lakeland, a few days after the wedding. The doctor also forgot, in his desire to prove his theory, that the salad which he analyzed had come to him in this same can, from which the mushrooms had just been removed, which would have accounted for the spores which he discovered in it.

That the mushrooms appeared in fæces which were examined was not to be wondered at, as the patient from whom they were obtained admitted eating them as well as the salad.

As for the symptoms, no attempt was made to differentiate between poisoning from poisonous mushrooms (muscarine) and that from decayed mushrooms (ptomaines), so the symptomatology was a little confusing; but, laying all else aside, the simple, undisputed fact that Bridget Cain was taken sick before the mushroom cans were opened disposes of that theory effectually.

It will be remembered that sixty-eight of the seventy-six acknowledge to eating the salad, and that none of the eleven who escaped did eat it. This is very strong presumptive evidence that the salad was the source of mischief.

It was learned that four persons in Eminence, Ky., were sick who had not been present at the wedding, but had received food from there; so a letter was addressed to Mr. W. B. Crabb and particulars requested. The following was received in answer:

DR. JAS. S. CHENOWETH, Louisville, Ky.:

Dear Sir—Yours of May 1st at hand. Mrs. Crabb and I were at the fatal wedding. I ate of every thing on my plate except the mushrooms; she ate heartily of every thing, consisting of salad, mushrooms, ham, beaten biscuit, drank no coffee or chocolate, but drank a glass of water. I drank a cup of coffee, also a glass of water. Mrs. Crabb brought nothing home with her but cake and salad. My daughter Fannie, son Lewis, and hired girl ate of the salad, and were all very ill. My son Guthrie ate

only the cake, and was not sick at all. There were no mushrooms or sauce from mushrooms brought to Eminence, nor were there any mushrooms in the salad. If I can be of any service to you, I shall be glad to do it. Very respectfully,

W. B. CRABB.

EMINENCE, KY., May 9, 1881.

This statement fixes the fault on the salad beyond any doubt, and the question arises, if the poison was not one of the ordinary minerals or vegetables, what is it?

This salad contained chicken, celery, olive oil, vinegar, salt, pepper, and mustard, was made on Wednesday morning and put in a tin pan on the side-board in the dining-room and was served from there to the plates of the guests.

The celery was fresh and clean; the dressing was repeatedly tasted by those preparing it—hence we are forced to conclude that the chicken held the poison.

Bridget Cain, the cook, was taken sick on Tuesday evening, the day before the wedding. It is worthy of note here that this was some fifteen hours before the cans of mushrooms were opened or the salad mixed up.

This woman ate a hearty breakfast on Tuesday morning at the Herr residence, but not feeling well she ate very little dinner or supper. Between breakfast and dinner she picked the chickens to pieces and ate some of the dark meat, remarking at the time that it looked darker than usual. This chicken was the only thing eaten by her on that day which was not eaten by the rest of the household, and the only thing which was served on the next day to the guests. This corroborates the circumstantial evidence against the chicken.

The question now arose, were the chickens diseased with chicken cholera, which was known to be epidemic in the neighborhood, or was the poison a putrefactive alkaloid generated after the cooking of the fowls? An examination of the fowls from which these had been taken failed to disclose any disease among them, and Mr. Herr stated that no disease had been among his fowls for years. Even had these fowls been diseased, the cooking to which they were subjected would have destroyed, in all probability, the germs of disease and their ptomaines, so the poison must have generated after their removal from the stove. This de-

duction is proved to be true, for the giblets cooked in the stove, and the soup made from portions of these same chickens which were left after removing what was needed for the salad, served hot, produced no sickness in those eating them, while the cold chicken eaten by Bridget Cain on Tuesday and the guests on Wednesday produced sickness in all.

It will be remembered that the weather was very warm at the time of this wedding, and every thing was favorable for the growth of bacteria and formation of their poisonous products, the chickens being cooked, shut up in a safe in a warm room, some of the liquor being left upon it. The conditions could not have been rendered more favorable in the laboratory than were here furnished naturally, so it is not surprising that putrefaction commenced in these chickens and, the conditions remaining favorable, continued in the salad.

The points that were suggested and thought to conflict with this view of the case were that the Herr family ate of this chicken on Tuesday without being made sick, and that Drs. Kastebine and Pope had eaten the chicken from salad a week later with like result, and that it was not eaten at the wedding by two of those who were afterward sick. Again, it is urged that "high" game is eaten constantly without ill effect.

That this chicken was eaten by the Herr family is true, but it was eaten hot and before any putrefactive change could have taken place. This was admitted, and of itself clears the little negro, Jim Drane, of any suspicion of having poisoned the chickens with arsenic while cooking, for this poison would not be affected by such heat. It is also true that chicken from the salad was eaten by Drs. Kastebine and Pope, but as a poisonous alkaloid may be present on the third day and entirely decomposed on the eighth, it is evident that they ran no great risk in eating the chicken when they did. Again, when the attention of the gentlemen above referred to was called to the fact that they had soaked the chicken which they afterward ate for some days in alcohol and ether, they acknowledged that these substances would have extracted any ptomaines and killed any bacteria which might have been present. As

the substances which were eaten by the two persons who claim to have eaten no salad were eaten by those eleven who were not sick, it is evident that the memory of each of the aforesaid two must have been shaken as was the rest of the economy.

The "high" game which is eaten is always well cooked before being served, and I doubt if any one can be found who would care knowingly to indulge in the luxury of game which had become "high" after cooking.

It has been said that if these poisons would develop so quickly we should all have been poisoned long ago. But I will warrant that most readers of this paper will be able to recall cases of sickness due to the ingestion of decomposing meat, milk, or other articles of food, and I think, in view of the facts here presented, there is only one conclusion to make, and that is, that this last distressing affair was the result, not of any especial negligence or maliciousness, but of an unfortunate and unforeseen combination of circumstances brought about by a total lack of knowledge, in those preparing the food for the wedding, of the poisons which may be generated in decomposing organic matter.

Some apology is due to my medical readers for the very simple non-technical manner in which I have considered this subject, but I did not desire to make use of any of the chemical or bacteriological experiments which were conducted by my friend, Dr. H. M. Goodman, and which fully confirm the statements here made. I also found, soon after getting mixed up in this poison business, that my position was violently opposed by not only one or two of my medical brethren, but also my friends in the county, who were confident that they had been maliciously poisoned, or to use a familiar phrase, which is much more appropriate than elegant, "I was between the devil and the deep, blue sea," so that I have had in this article not only to satisfy his satanic majesty, but also pour a little oil on the troubled waters.

(From American Practitioner and News, August 29, 1891.)

FINAL EXAMINATION.

BY H. M. GOODMAN, M. D.

Demonstrator of Physiology, Bacteriology, and Pathology, University of Louisville.

Viscera of Mrs. Guthrie. The post-mortem examination of Mrs. Guthrie was held at the residence, April 23, 1891. *Rigor mortis* was well marked. The incision was made from the ensiform cartilage to the pubes, the transverse incision on each side from the umbilicus to the crests of the ilii. Visceral peritoneum was adherent to the parietal peritoneum. The stomach and small and large intestines were intensely injected, and presented numerous black spots. These spots were movable, and represented particles of fecal matter. The intestines were moderately distended. The posterior wall of the stomach was adherent to the transverse duodenum and the peritoneal covering of the pancreas. Spleen very small. Liver enlarged, congested, soft and friable; gall-bladder very much distended. Transverse colon adherent to the jejunum. Mesenteric vessels congested with dark blue blood. Contents of intestines composed of dark green matter, almost black, consisting mainly of mucus, pus, and granular debris with some fecal matter. Great vessels of spleen, stomach, liver and kidneys empty. The specimens were placed in proper jars and sealed with the official seal of the coroner, and sent to the University laboratory.

Dr. Turner Anderson turned over copies of all prescriptions used in the treatment of the case.

These jars were opened by Coroner Miller in the presence of Drs. Anderson, Cottell, Goodman, and Howard.

The stomach, on being removed from the ninety-five-per-cent alcohol in which it had been placed, gave off a putrescent odor. On the posterior surface the branches of the gastric vessels were injected, and the surface discolored about the pyloric extremity; there was considerable puffiness of the peritoneal coat from broken adhesions. On the anterior surface the vessels were injected, and the mucous membrane for a space of 2x2 inches was eroded, as well as the muscular coat down to the peri-

toneal coat; inflammatory injection of both surfaces near the pyloric end. No material was found adhering to the mucous membrane; three ulcers were seen at the pyloric extremity, and the mucous membrane was eroded. At the esophageal extremity were four large ulcers extending down to the peritoneal coat.

Intestines: The mucous membrane in two or three places was eroded and destroyed down to basement membrane; no sphacelation whatever; one minute ulcer extended down to muscular coat; a few ulcers were found in the jejunum and ileum. The lumen of the gut was contracted and the mesenteric vessels injected.

The same conditions of inflammatory action were found throughout the entire large intestine, the ulcers, some forty or fifty in number, being confined principally to the cæcum. The contents of the intestinal tract were composed of a dark bile-stained mass, and this material was adherent at the seat of the ulcers.

Stomach contents were examined, after proper treatment by many separate tests for arsenic, with negative results. Another portion was especially examined for mercury and copper, but none was found. The remaining portion of contents and stomach, after destruction of organic matter, was examined for arsenic, antimony, lead, mercury, copper and tin, but the result in every instance was negative.

Microscopically no crystalline substance nor botanical fragments were found. The contents were composed of mucus, pus, granular debris, free fat, epithelium (some undergoing fatty degeneration), and bile, as shown by proper tests. The hæmin test for blood was negative. Stained and examined for bacteria, many varieties were found, especially pus organisms, and a peculiar rod-like bacillus, similar to the ones found in the salad. Microscopic examination of the contents of the small and large intestines showed, in addition to fecal matter and muscular fiber, essentially the same conditions. The hæmin test for blood was negative.

The specimen of subnitrate of bismuth used in Mrs. Guthrie's case was examined and found to contain minute traces of arsenic.

The liver, spleen, and kidneys, after proper treatment, were examined for the same metals, especial efforts being made to determine the

presence of copper, arsenic, and mercury, and in every instance we failed to detect the slightest trace. This work was done by Prof. H. A. Cottell and Dr. Goodman, assisted by Dr. Howard and Mr. I. C. Young.

Viscera of William Terry. Mr. Terry died at noon, on April 25, 1891. The autopsy was conducted by Dr. H. C. Miller, Coroner of Jefferson County, in the presence of Dr. C. W. Harvey. Dr. Harvey's letter to the coroner is as follows:

DEAR DOCTOR: I was called to see Mr. William Terry about eighteen hours after he partook of the fatal dinner at Mr. Albert Herr's. I found him very much prostrated from having purged and vomited almost incessantly for several hours before my arrival, his greatest trouble being in his bowels. I at once had the lower bowel flushed with hot water, after which I had injected twenty drops of tincture of opium. I also gave him Belle of Nelson whisky, and had hot applications used over his bowels. I also gave him small doses of subnitrate of bismuth and sacch. pepsin every four or six hours, but he only took two or three doses, as he did not complain of being very sick at his stomach. I had his bowels flushed with the hot water every six or eight hours, using the laudanum afterward, which gave him marked relief. On the fourth night, about 12 o'clock, he went into a collapsed state; whisky applied externally and given freely internally, with hot bottles. Failing to bring on reaction, I gave him whisky with ten drops of tincture digitalis, hypodermically, which brought on partial reaction. From this time until his death I used nothing but stimulants and concentrated nourishment, with an occasional ten-drop dose of digitalis. I send sample of bismuth; let me know if above is not enough. I have to hurry so much to get this in the mail that I may have left out something important.

ANCHORAGE, April 27, 1891.

C. W. HARVEY.

The viscera were contained in two glass jars, one with a glass top, the other with a japanned tin top, and both were sealed with the official seal of the coroner. Upon examination the seals were found intact, and they were then broken in the presence of the following gentlemen, Drs. Cecil, Howard, Chenoweth, Goodman, and Mr. I. C. Young.

Inspection: Stomach showed signs of inflammation when viewed externally, the vessels particularly over the posterior surface being injected. Upon being opened the contents were received in a separate clean glass receptacle. No signs of threatened perforation or perforation was noticed. There was a diffused congestion of the mucous membrane, with catarrhal exudate on the surface and infiltration of the submucous coat. Some minute

white dots were found in the substance of the mucous membrane, which, upon examination, were found to represent small foci of pus. Submucous and muscular coats slightly hypertrophied, especially toward the pylorus. Toward the pyloric extremity and extending into the central zone the tubules were enlarged and broken down. The mucous membrane was coated with mucus, especially toward the pylorus.

Stomach Contents: The contents were composed of a small amount of a yellow semi-transparent fluid. Microscopic examination of this fluid showed no crystalline substance, only mucus and a few pus corpuscles and fat cells and columnar epithelium. The hæmin test for blood showed none.

Duodenum: At the junction of the duodenum with the pyloric end of the stomach was found a growth which began as a flat infiltration of the submucous coat, which partially surrounded the intestine, infiltrating its whole thickness. Small fungous masses projected into the intestine at this point, and there were evident signs of ulceration about the seat of the growth. This growth was probably carcinomatous, though no microscopic examination was made.

The entire small and large intestines were in a state of acute catarrhal inflammation, extending to all three coats. The solitary and agminate glands were congested. The mesenteric vessels were intensely injected through the entire extent of the intestines and the amount of mucus very much increased. Mucous membrane eroded in places, though there were no signs of impending perforation. Lower portion of small intestine and the colon presented in many places patches of ulceration. The ulceration in some instances extended down to basement membrane, in others down to muscular coat.

Contents of Intestines: A yellow, glairy, semi-transparent fluid. Microscopic examination showed mucous corpuscles, bacteria cells, pus cells, fat and epithelium, and granular debris. Hæmin test for blood showed none.

The liver, spleen, and kidneys appeared healthy. A large gall-stone was removed from the bile-duct.

Chemical Examination. After proper treatment with pure hydrochloric acid, each one of the viscera was examined separately: The stomach, contents, and intestines for contained poisons; the liver, spleen, and kidneys for absorbed poisons. The resulting liquids were then successively submitted to Reinsch's and Marsh's test, and in every instance we failed absolutely to demonstrate the presence of either arsenic, antimony or mercury. It was not thought necessary to examine these viscera for other poisons, as these had been sufficiently excluded in the examination in the case of Mrs. Guthrie. The specimen of bismuth sent by Dr. Harvey was examined for arsenic and found to be pure.

RESUMÉ OF THE EVIDENCE, CLINICAL AND CHEMICAL, AND THE CONTINUATION OF THE INVESTIGATION.

BY H. M. GOODMAN, M. D.

The chemical investigation having failed to demonstrate the presence of poison, either of a vegetable or mineral nature, the search was continued through some other material that had been placed at my disposal in the hope of probably settling the question definitely.

Before detailing the results of this portion of my work, I desire to consider these cases from the standpoint of their clinical symptoms and to discuss fairly and impartially some of the many theories that have been advanced. That the poisoning was due to some irritating substance is so apparent that it may be accepted as proven beyond all question of a doubt. Among the many substances capable of exciting the symptoms of intense gastro-intestinal irritation we find poisons of a vegetable or mineral nature, and lastly, but by no means least, the "animal irritants."

The symptoms of irritant poisoning are so nearly akin that it may at times be impossible to separate the one from the other by clinical signs alone, yet the difference of symptoms in poisoning between the three classes of irritants is in many respects so marked that, in spite of the similarity, it is possible by careful study of the occurrence of the symptoms to separate the one from the other, even in isolated cases. Prominent among the various mineral irri-

tants are found such substances as the mineral acids, the alkalies and their salts, phosphorus, iodine, bromine, chlorine, arsenic, antimony, mercury, lead, copper, zinc, iron, bismuth, tin, and chromium. The principal vegetable irritants are oxalic acid, tartaric and acetic acids, carbolic acid, croton oil, elaterium, castor-oil beans, colchicum and savin, veratrine, yellow jessamine, gelsemine and gelsemic acid, poisonous mushrooms, etc. Among the list of animal irritants we find cantharides, poisonous animal food (ptomaines), sausage poison, cheese poisons, poisonous fish, putrescent food (ptomaines), poisoned flesh.

The arsenic theory, or that the poisoning was due to any mineral substance was, aside from the clinical evidence, sufficiently disproven by my former analysis of the suspicious articles of food, and the bowel and urinary discharges of two of the worst cases (both died), obtained before the close of the second day after the fatal dinner. This is further proven by the analysis of the viscera and contents from the two fatal cases, one of whom died on the seventh day and the other on the ninth day.

The Copper Theory. The idea that the poisoning was due to copper emanated in Cincinnati, after an analysis performed upon the organs of the groom. This theory was based upon the statement that the chemist had discovered traces of copper in all the viscera. The newspapers, ever ready for a clew, immediately heralded a "new theory." If I remember aright, after reading the report of the chemist to the coroner, I was struck with its exceeding mildness. After stating that he had found traces of copper in all the organs, he wound up with the remark, "that he was forced to the conclusion that it might be copper." It might have been that some of his chemicals or apparatus were impure. If such poisons as arsenic, mercury, antimony, oxalic acid, copper, etc., can not be detected by their reactions in a test glass, I am exceedingly doubtful about the propriety of giving positive evidence as to their presence from their microscopic form and reactions alone. To manufacture evidence entirely from the micro-chemistry of poisons is an extremely hazardous proceeding. The salts of copper most frequently used in criminal

poisoning are the sulphate, verdigris, and cupric hydrogen arsenite (Paris green). Poisoning by the latter salt would have produced symptoms of arsenical and copper poisoning combined, and arsenic would have been found as well as copper. "The fatal dose has not been determined; half an ounce of verdigris has proved fatal, and an ounce of the sulphate, but larger quantities have been swallowed without producing death." (Reese, p. 331.) It is not very likely that seventy-five people would stand up and swallow seventy-five ounces, more or less, of either of these substances, and no one discover it until six or ten hours later. In case it was not placed in the food by some malicious person, all the copper utensils in the neighborhood would have been called into requisition to furnish the desired amount. And, lastly, in none of these cases did a purple line form around the gums, nor did any of them develop jaundice. The latter symptom is said by many authorities to be a pathognomonic symptom of copper poisoning, while it is never met with in poisoning by arsenic or mercury.

The Chicken-Cholera Theory. Another idea advanced, I do not know by whom, is that the illness in all these cases was due to the fact that the chickens were diseased. This sounded plausible enough at first glance, but when I found that the chickens and turkey used in the preparation of the salad were full grown, I did not believe it. At least two hours are required to thoroughly cook a full-grown hen, and the time and temperature necessary would have been sufficient to have destroyed the bacillus of chicken cholera and its spores (the spores being a most resistant part of a bacillus, and we do not know positively as yet, that the chicken-cholera bacillus forms spores). had any been present. Dr. Chenoweth brought to me, along with the other articles, some of the intestines of the chickens that were used at the wedding, and found by him in a tin pan in the cellar. Cultures were made from them and set aside for development. In the mean time the effort was made to extract ptomaines from them by the Stas. Otto method.

The various extracts gave the following reactions:

REAGENT.	ALKALINE ETHER EXT.
Phosphomolybdic acid.	White precipitate.
Platinic chloride.	Light yellow precipitate.
Potass. merc. chloride.	White precipitate.
Auric chloride.	Purple precipitate.
Ferrocyanide of potass.	White precipitate.
Tannin.	White precipitate.
Mercuric chloride.	White precipitate.
Ferric chloride.	Reddish-brown precipitate.

REAGENT.	ACID ETHER EXT.
Phosphomolybdic acid.	Yellowish-white precipitate.
Platinic chloride.	Yellowish-white precipitate.
Potass. merc. chloride.	White precipitate.
Auric chloride.	Dirty green precipitate.
Ferrocyanide of potass.	White precipitate.
Tannin.	Dirty white precipitate.
Mercuric chloride.	Heavy white precipitate.
Ferric chloride.	Yellowish-white precipitate.
Iodo-Iodide.	White precipitate.

Chloroform extract gave no especial reaction.

Injected into the bodies of two full-grown hens in doses of three fourths to one dram of the diluted extract produced no result. One dram given by the mouth to another hen produced an irritative diarrhea, lasting about forty-eight hours.

These extracts when compared with similar extracts taken from a hen that died of chicken cholera, and with those previously obtained from the salad, were so entirely different that no analogy could be made between them. The microscopic examination of these intestines and the glandular and muscular structures of the chickens for the cholera bacillus was negative. The cultures were accidentally misplaced and could not again be identified. While it is true that the intestines and organs of the fowls brought me may not have been those of the fowls diseased, as they were all heaped up in a mass in the receptacle in which they had been placed, and evidently forgotten in the excitement that followed, I do not believe, for the reasons above stated, that chicken cholera had any thing to do with the illness.

"*The Mushroom Theory.*" Before entering into a full discussion of this theory, I desire to quote the following extracts, taken from the article by Von Boeck (*Ziemssen's Cyclopaedia of the Practice of Medicine*, vol. xvii, 1878):

Some authors pronounce all fungi to be poisonous, while others say that very few are so. This difference of opinion arises from the fact that some consider certain fungi to be poisonous because they may have produced symptoms of poisoning in those who have partaken of them, and they do not consider whether it is that these fungi contain an integral

poison, or *whether other circumstances have tended to make the eating of them injurious.* (Italics mine.) If we assert that a fungus is poisonous, we must be able to prove that it, taken as a plant, contains a substance which, under ordinary circumstances, acts like poison on the life and functions of the human or animal organism. If a fungus does not produce poisonous effects under ordinary circumstances, but leads to illness when special conditions prevail, the fungus, as such, is not to be designated as poisonous. Again, mushrooms are very watery substances; they contain up to ninety per cent of water, but they are also comparatively rich in vegetable albumen, so they contain between 3.2 and 7.2 per cent of nitrogen. Substances so composed become very easily decomposed, and the products of this decomposition may, as in the case of meat, cheese, sausage, and other kinds of food, act very injuriously on the organism, especially the alimentary canal, and may under certain circumstances even produce fatal effects. But these occurrences do not furnish us with data for concluding that the mushrooms are in themselves poisonous.

Disease through Decayed Fungi. It is characteristic of all diseases caused by the fungi that they produce violent intestinal symptoms. As a rule the symptoms appear after six to eight hours, seldom earlier, frequently later, so that in some cases the first symptoms of illness do not set in till after eighteen to twenty-four hours. They usually begin with pains in the stomach and intestines; violent colic is the earliest symptom, soon followed by great nausea, with increase of the salivary secretion and then vomiting. This vomiting is seldom over at once; it is generally repeated at longer or shorter intervals, and may last three days, or even longer. Soon after the vomiting diarrhea begins; the actions frequently become purely serous in character, very like the rice-water discharges of Asiatic cholera. The gastro-intestinal symptoms are directly followed by those of acute drain of fluid. The plumpness of the skin disappears, the eyes sink back in their orbits, the features become pinched and cold, slight cyanosis spreads over the whole body, cardiac contraction becomes insufficient, respiration is labored, and convulsions appear in different groups of muscles, while the patient suffers from insatiable thirst. In some cases these symptoms are succeeded by a condition of sopor, and sometimes, with children, by general convulsions.

The word decay is synonymous with putrefaction; and I presume that the author, in speaking of the poisonous properties of simple or non-poisonous mushrooms, had reference to those changes which occur in any dead nitrogenous organic matter when exposed in the atmosphere under proper conditions of moisture and temperature. Unfortunately, in the days when this article was written, the phenomena of putrefaction were not as thoroughly understood as they are at present, and although the author makes a distinction between mushrooms which contain an integral poisonous principle and simple or non-poisonous mushrooms which become poisonous through decomposition, he was unable to state the cause.

We know to-day that when a non-poisonous mushroom becomes poisonous through putrefaction, this result is brought about through the agency of bacteria, and the poisonous principle is a *ptomaine*, or other poisonous product of germ life, and that the nature of the poison depends upon the special germs engaged in its elaboration and the conditions of their environment.

Poisonous Mushrooms. The varieties of mushrooms that are said to contain a poisonous principle are as follows: "The *Amanita muscaria*, or fly fungus, the active principle of which is muscarine, the *Amanita phalloides*, *S. venoso*, the *Russula integra*, and *Boletus luridis*." (Von Boeck.) The active principle of the three last varieties is unknown, or at least very uncertain. Woodman and Tidy (vol. xvii, 1877) speak only of the poisonous proportions of the "*Agaricus muscarius*," and with reference to the other poisonous varieties leave one in doubt whether they contain an integral poison or not. Reese, (ed. 1891) remarks that "The poisonous principle of certain fungi appears to be volatile, since boiling renders them innocuous." He gives a quotation from Orfila of a case of poisoning from the *Amanita citrina*. Blythe (ed. 1885) ascribes poisonous properties to the "*Amanita muscaria*, the *Agaricus phalloides*, a common autumn fungus often mistaken for mushrooms, the *Agaricus ruber*, a bright red fungus of a purple color, the *Soletus satanus*, found by Lenz to be poisonous when uncooked, and the common *Morelle*, which seems under certain conditions to be poisonous." It becomes very evident, even at this day, that the poisonous action of fungi is not thoroughly understood. So many conditions modify their action that at times an edible fungus may produce symptoms of poisoning; at other times extremely poisonous ones produce no bad effects. "The active principle of a poisonous mushroom is believed to be volatile, and is dissipated by the action of a moderate heat. It may in great measure be got rid of either by boiling in water or by soaking the mushrooms cut into slices in brine or vinegar." (Woodman and Tidy, 1875, quotation from British Medical Journal, page 285.) The subject becomes even more complex when it is known that "the poison *muscarine*, which

had been known as obtainable from a plant, the *Agaricus muscaria*, or fly fungus, has been discovered by Brieger to be a product of the decomposition of fish, and it has also been made synthetically by Schmeideberg and Harnack from choline. (Aitken on Animal Alkaloids.) Many of the cases of poisoning from eating fungi are due to the raw or imperfectly cooked varieties, or the fungus had been gathered by children, or by persons not sufficiently acquainted with their botanical characters to distinguish the edible from the non-edible, or an "edible fungus had been collected irrespective of the place in which it was found, its age, the conditions of the weather, or the length of time that elapsed after the fungus had been gathered before it was eaten was too great, all or any of these circumstances are said to occasionally produce ill effects." (Von Boeck.) If a mushroom containing an integral poison be eaten, the symptoms depend upon the amount of the dose and usually come on within an hour.

The symptoms of irritant poisoning that arise after eating flesh in a state of partial decomposition are sometimes so pronounced and resemble poisoning from the mineral irritants so strongly that they have frequently been mistaken for them. The older authorities in cases of this kind were forced to conclude, after a thorough demonstration of the absence of the mineral and vegetable irritants, that the poison was developed during putrefaction, but neither the nature of the poison nor the manner of its production was understood, and such cases were described as sausage poison, cheese poison, etc. With the improvements in the microscope and the researches of Pasteur and Koch, the one approaching the subject from a chemical, the other from a botanical standpoint, we know that bacteria are engaged in the destruction of dead organic matter, and that the poisonous products that frequently arise in these substances are due to their presence. The following cases serve to illustrate this point:

(Taylor, page 515): "It appears that in November, 1859, sausages were made and sold by a pork butcher at Kingsland, and were eaten by sixty-six persons, of whom sixty-four were attacked with violent symptoms of irrita-

tion in from three and one half to thirty-six hours subsequently to the meal. One case proved fatal. No symptoms appeared in this man until after the lapse of six hours. He was attacked with severe vomiting and purging, followed by shivering; there was pain in the throat, violent headache, and great prostration. The pulse was feeble and quick, and there was marked delirium, and the eyes were red. These symptoms underwent a remission, but he had a relapse, became comatose, and died on the seventh day. Latterly he complained chiefly of pain in the bowels. Dr. Letheby found on inspection no signs of inflammation of the stomach. The small intestines were much inflamed and the gall-bladder was distended. The other organs were healthy. The viscera contained no vegetable or mineral poison, as shown by a careful chemical analysis. There could be no doubt that the sausages caused the symptoms and death, the food in this case acting as a narcotico-irritant poison."

(Taylor, page 516, 1875): "Four members of a family of a shepherd were attacked with symptoms of irritant poisoning after eating a portion of mutton which had been given them. The father and mother suffered severe pain after the meal, and the latter had an attack of severe vomiting and became insensible. The children were seized with violent vomiting and purging, and the boy died three hours after the meal. On inspection the mucous membrane presented patches of inflammation, and there was inflammation of the peritoneum. No trace of either vegetable or mineral poison was found upon analysis, either in the stomach and contents or in the food."

(Reese, page 366): Putrescent or decayed meat, if eaten by man, may excite symptoms of a typhoid character or septicemia, and sometimes symptoms resembling cholera.

The Plomaine Theory. The algae and the fungi known under the common name of thallophytes are found lowest in the scale of vegetable life. The algae contain a substance called chlorophyl, and in this respect resemble the higher plants because they manufacture their nourishment out of simple inorganic substances. The fission fungi or bacteria as a class differ from the algae, in

that they contain no chlorophyl. The bacterium viride and bacillus virens have been found recently to contain chlorophyl. Bacteria are able, because of this absence of chlorophyl, to live only at the expense of organic matter. During their existence they produce changes in this organic matter which constitute the phenomena of fermentation and putrefaction. Bacteria are found everywhere there is organic matter, though as a rule they are less abundant in the higher altitudes. Among the hundreds of known varieties some have been discovered whose presence in the body is the actual cause of disease, though the vast majority are to be regarded as scavengers, transforming dead organic matter into inorganic matter. In this way they serve to maintain the equilibrium between the animal and vegetable kingdoms, without which life would be impossible, as one kingdom would rapidly absorb all available material and very soon become extinct. Like the higher plants, bacteria grow best at certain temperatures. The most favorable temperature for many varieties being between 80° and 102° F. When the temperature is higher or lower than these figures their vegetation and the formation of spores diminishes, and finally ceases altogether at very high or low temperatures. The soil best adapted for the growth of most bacteria is either vegetable or animal infusions or broths, no one soil being adapted to all forms, but the main constituent in all cases is albuminoid matter. When they come in contact with nutritive matter they bring about changes by means of diastases, and in this manner they obtain their nourishment. Bacteria are divided into two great classes, the parasitic, which feed on living plants or animals, and the saprophytic, which live at the expense of dead organic matter. These two great classes are variously subdivided; thus some that are normally saprophytic may under certain circumstances live as parasites, and the parasites have also the power of living at the expense of dead organic matter. In the process of putrefaction no one kind of germ is alone concerned, but there are several, and they may be very different at different times. It is thus apparent that the products resulting from the growth of bacteria during putrefaction

depend not only upon the character of the germs but also upon the nature of the soil. We may therefore regard putrefaction as the sum total of the nutrition of bacteria at the expense of organic matter. During these processes urea is transformed into carbonate of ammonia, albumen into peptone, sugar is converted into alcohol, and when the amount of alcohol reaches a certain percentage the further action of this germ is prevented by its own products; and if the liquid remains exposed to the air the entrance of other germs, which are everywhere floating around, causes the conversion of the alcohol into acetic acid (vinegar). In addition there may be developed, as other products of decomposition in various fluids, sepsin, certain narcotics, leucine, tyrosine, indol, skatol, phenol, sulphuretted hydrogen, etc. Among the highly poisonous products developed during the life of bacteria are the ptomaines, certain other poisonous products, whose nature is less understood than the ptomaines, that are called toxalbumens, and finally other poisonous products called bacterial protean. The ptomaines are of the greatest interest to the practical physician, because of the similarity in chemical reaction to the vegetable alkaloids. It will be seen at a glance, from this rough sketch, that this new field, only recently opened up to the toxicologist, is entirely too large for us to venture a positive opinion as to what conditions of soil, temperature, moisture, etc., will enable germs at one time to elaborate highly poisonous principles, at others comparatively inert substances. Almost every day brings forth new discoveries, and, with the field already occupied with thousands of active workers, it is highly probable, ere long, that the circumstances under which they are formed and the nature of their reactions will be as thoroughly understood as the chemistry of the inorganic poisons. One fact in connection with the formation of these poisonous products during the process of putrefaction is, I think, sufficiently demonstrated, and that is, that in the early stages of putrefaction, long before there is any perceptible odor, the most poisonous bases are formed, and as putrefaction advances the toxicity of these poisonous products prevents the further growth of the germs engaged in their elaboration. The

entrance and growth in the putrefying material of other germs cause a destruction of these highly poisonous products, and their place is taken by the final products of decomposition which are comparatively inert. "Highly poisonous products of decomposition found on the third day in putrefying material have completely disappeared by the eighth day." (Flügge, 573).

I could readily understand how these people might have been poisoned by *decayed* mushrooms (ptomaine poisoning), if it were proven that all had eaten mushrooms. Neither Mr. nor Mrs. Guthrie ate mushrooms, and the letter of Mr. Crabb, of Eminence, precludes the idea of mushrooms or mushroom sauce being mixed with the salad, as might have happened on the plates that the food was served in at the wedding. That the poisoning was due to an integral poison in the mushrooms is disproven, because the symptoms do not correspond to the symptoms of muscarine poisoning and other poisonous mushrooms, and also because the six cases mentioned above ate no mushrooms. That the principal cause of the trouble was in the salad there can be no doubt, because, of the sixty-two cases recorded by Dr. Chenoweth, sixty ate salad, and two were uncertain, and of eleven guests who escaped, none ate salad. It is possible that other articles of food may have become infected from the same cause or causes that were at work in the salad. It has been stated, in opposition to this idea, that members of the family ate the giblets and soup made from the same chickens that were used at the wedding and were not made sick. This signifies nothing, as these articles were served *hot* and immediately after their removal from the source of heat employed in cooking them, whereas the chickens were boiled Monday afternoon and placed in covered vessels in the safe with some of the liquor ~~yet~~ on them; and, if I am correctly informed, two of the chickens, not being sufficiently done, were left with the other portion of the liquor in the iron pot and cooked again the next morning. The girl, Bridget Cain, after eating a portion of the chicken Tuesday morning, remarked that they tasted slightly bitter. That afternoon she was taken sick and

developed the same symptoms and was as violently ill as any of the other cases. This was before the mushrooms were opened. The average temperature for Monday, Tuesday, and Wednesday, the time that elapsed between the cooking of the chickens and the fatal dinner, was 65° —the highest being 80° , the lowest 49° . The conditions were certainly favorable to decomposition: a warm kitchen or pantry, a warm outside temperature, an animal broth contained in a vessel and set aside in a safe; this, while closed sufficiently to retain heat for a considerable time, was not tight enough to prevent the entrance of air and along with it bacteria. The ptomaines obtained from the salad in my previous analysis did not give reactions that responded to the usual tests for the known ptomaines, but that they were poisonous was evidenced by the fact that one cubic centimeter of the diluted extract killed a full-grown hen in less than half an hour. Unfortunately, when I first began this examination, the tests necessary for the mineral poisons consumed so much of my material that I had but a small portion left. These I divided, testing one portion for cantharides, another for the vegetable alkaloids, and the remainder for putrefactive alkaloids, and the final extract was so small that I had barely sufficient for the chemical and physiological tests, and therefore made no attempt to obtain the alkaloid in a pure form.

Septic Infection. If we introduce into the body of a healthy animal putrid material free from germ life, the symptoms that occur depend upon the nature of the products, and also upon the amount of the dose. On the other hand, when we introduce into the body of a susceptible animal living bodies capable of undergoing multiplication at the expense of their host, the symptoms are entirely independent of the amount of the dose.

When I first began this examination I made a microscopic examination of portions of the salad. While searching particularly for crystalline substances, I was struck with the immense amount of bacteria present. I stained several cover glasses in methyl-blue, and under higher powers of the microscope made out all the forms shown in the following diagram:



Fig. 1. Organisms from the Salad. (Reichert, 1-15 H. I.)

The organism to which I desire to call particular attention is the bacillus, shown most prominently in the plate. These bacilli were rounded at the ends and were single or united in chains of two or three. They varied in length from two to eight micro-millimeters, and in many instances contained spores either toward their middle or at one end. I had made stabcultures from the contents of the bowel of Mrs. Guthrie, taken from a small portion of the gut which I had included between ligatures and taken immediately to the University. These cultures, when examined microscopically, showed various forms of microorganisms, among which I recognized the same bacillus. I succeeded in separating these organisms, and grown in gelatin they liquefied the gelatin and developed a peculiar fetid odor. Inoculated into the bodies of two mice they produced fatal results. I am at present engaged in the endeavor to separate the ptomaine of this bacillus, but have not as yet succeeded because I have found all my cultures contaminated with a coccus. Longitudinal and transverse sections were made of the kidneys, liver, and spleen of both subjects. The cortical substance was thick and mottled with red, and very much congested. The pyramids were red. After section by microtome and examination by microscope there was evidence of congestion, an emigration of the white cells with diapedesis of the red. There was also swelling of the renal epithelium and structural changes in the glomeruli. The blood in the large renal vessels was also examined, and showed structural changes in the red and white corpuscles. Under

high powers of the microscope, after staining by Gram's method and contrast in eosin, the emboli in the capillaries of the kidney were found to consist of masses of bacteria similar to those found in the salad. The glomeruli had in many places undergone partial obliteration.

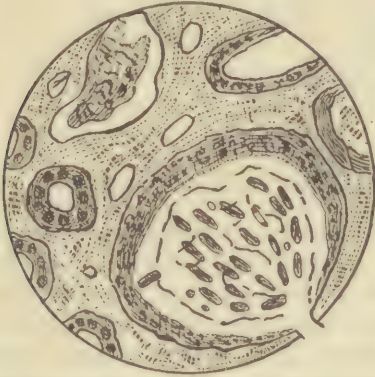


Fig. 2. Section of Kidney; Fatal Case. (Reichart, 1-15 H. I.)

Liver. Sections were also made of portions of the liver. After staining by Gram's method and thoroughly decolorizing, the sections showed in many places the blood-vessels filled with bacilli of the same shape and size found in the kidneys. In places they had escaped

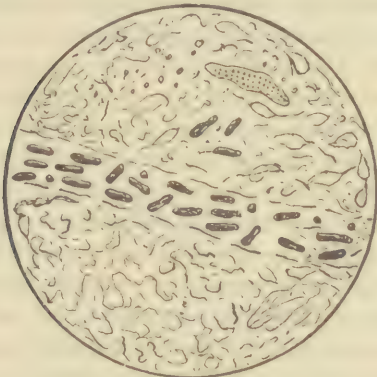


Fig. 3. Section of Liver; Fatal Case.

into the tissues through the ruptured blood-vessels. In other sections the emboli in the capillaries of the liver (spleen, and also the kidneys) was found to consist of masses of cocci. Around these areas the liver cells were found in various stages of necrosis; in many the nuclei did not stain, and in places there was marked pigmentary degeneration. The bacilli found in these organs were elongated,

and in many places in a state of spore formation. According to the source of the intoxication through bacterial products there are certain symptoms which admit of classification. It is a well-known fact that poisoning by most of ptomaines is attended by a subnormal temperature, and on the other hand, when the poisonous agent is an extractive, the rule is an elevation of temperature. I presume it is not unwise to infer that we may have a succession or combination of these conditions, according to the combination or alternation of these products or to the predominance of the one over the other. I believed, after a careful study of the symptomatology of these cases, that the illness was of bacterial origin. With the evidence as obtained, the extensive ulceration in the large and small intestines, the exclusion of arsenic and other mineral and vegetable irritants by thorough chemical analysis, the discovery of bacterial products in the salad (three days after the wedding), the recognition of pathogenic and saprophytic organisms in the salad, the discovery of many of the same forms in the bowels of Mrs. Guthrie, with others that may have had a secondary influence, and, lastly, the finding of the same bacilli and cocci in the tissues of the liver, spleen, and kidneys, forming emboli in the blood-vessels and imbedded in the tissue; these facts, taken in connection with the clinical history (seventy cases in all, with a period of incubation preceding the illness of not less than four hours in a single case and in many as late as eighteen to twenty hours after the dinner), leave no room for doubt that the cause was the ingestion of a culture of specific bacilli contained in the salad. The growth and development of these organisms in the stomach and bowels of these people produced the bacterial products, the absorption of which into the system gave rise to the constitutional disturbances. The action of the organisms and their products produced inflammation and destruction of the mucous membranes of these organs, causing acute gastro-enteritis, and through the exposed mouths of the blood-vessels and lymphatics the organisms were carried into the system, locating in various organs and starting new foci of infection. An organism similar to this bacil-

lus was found in the liver and kidneys of several fatal cases in the epidemics produced by putrid meat at Welbeck in 1880 and at Nottingham in 1881. The organism was discovered by Prof. E. Klein, of London, and he describes it as the "bacillus of choleraic diarrhea from meat poison."

TESTIMONY BEFORE THE CORONER.

Dr. James S. Holloway thought the sickness due to spoiled mushrooms; had no idea what a ptomaine was until afterward.

Dr. Moses Collins thought the sickness due to mushrooms.

Dr. James S. Chenoweth thought it due to decomposition in the salad.

Dr. P. B. Scott thought it due to ptomaines.

Dr. T. Hunt Stucky thought the sickness was due to an irritant, probably of a vegetable character.

Dr. Wm. L. Rodman: Symptoms did not resemble those of arsenic poisoning.

Mr. J. A. Flexner (Evening Post, June 10, 1891) testified as follows: "Am in the drug business and do some analytical chemical work. Examined the vomit of one of the patients and some urine. Made a hurried test of vomited matter, and found what appeared to be an evidence of arsenic. The urine was then brought in and I dropped my work on the analysis of vomit. Used Reinsch's test in analyzing the urine. Found less than a ten-thousandth part of a grain of arsenic in urine, but the trace was unmistakable. The copper was covered less than ten minutes after being placed in contact with the urine. Got a characteristic octahedron crystal. Found traces of arsenic in vomit. Dr. Anderson had administered bismuth to patient whose vomit I examined. I examined a portion of the bismuth given and found no arsenical adulteration. Dr. Irwin brought me some copper slips which yielded an arsenical sublimate. Examined none of the food of the feast. The most prominent feature of the symptoms of arsenical poisoning is its variableness. The witness cited a case where a child who had swallowed arsenic was not taken ill for three or four hours afterward."

Dr. Turner Anderson had rather inclined the belief that the patients were poisoned by

arsenic until the result of the analysis at University were made known. Since then his views had changed.

Dr. J. W. Irwin (Louisville Commercial, June 10, 1891) testified as follows: "Had treated Mrs. Herr and six other people who were ill from the feast." In all cases the symptoms pointed to arsenical poison, and in all cases he had administered castor oil and magnesia, and gave his reasons for doing so. Dr. Irwin's theory is that there was arsenic placed in all the food. The doctor discussed at some length the ptomaine theory, and insists that it is absurd.

Dr. Wm. Bailey did not think patients were suffering from arsenical poisoning. Had seen two cases.

Dr. D. W. Yandell had seen several cases. There were some symptoms like those of arsenical poisoning, but the arsenic theory was negated by the history of the cases.

Dr. T. L. McDermott had seen one case. He did not think the illness was due to arsenic.

Dr. H. A. Cottell had seen two cases. The symptoms were not those of arsenical poisoning.

Mr. Albert Shoettlin, druggist, had examined specimens of copper-foil brought to him by Dr. Irwin; he also made a rough test of urine. A deposit was found on copper which was thought to be arsenic. A portion of the first foil was given to Mr. Flexner, who found arsenic. Another portion of the same strips was given to Dr. Kastenbine, who found that it was not arsenic but sulphur. Witness accepted Dr. Kastenbine's opinion as the right one.

Dr. Kastenbine had examined chicken salad, milk, water, and earth about the spring, and found no evidence of arsenic or other mineral poisons. He had also examined various dejecta and urine for arsenic, and found none. Tested strips of copper sent him by Dr. Irwin and found no arsenic on them, but sulphur. Witness had also tested milk for tyrotoxicon. Witness thought the poisoning came from mushrooms. It was not in the chicken salad, because he had extracted the oleaginous portion of the meat by ether and eaten some of it without symptoms of poisoning. [Of course this would have made the meat innocuous.]

Dr. John L. Howard thought the poison due to ptomaines.

Dr. H. M. Goodman. (Testimony already given.)

The testimony before the coroner's jury developed some peculiar phases of psychological and forensic medicine. In the first place the inquest was badly conducted. Coroner Miller, actuated solely by the desire to obtain the truth, did too much admitting in evidence the opinions of all who had opinions, and these were legion. The jury, composed entirely of gentlemen taken from the mercantile walks of life, while all men of more than ordinary intelligence, were totally unacquainted with the technical reasoning of the case, and, confused by the mass of argument, did just what I should have done under the same circumstances, saying "We don't know," admitting that minerals were excluded. Nor do I blame them; for, compelled to listen to conflicting evidence, the absurd arguments, the unreasonable reasoning of layman, doctor, and expert, it is remarkable that they had heads clear enough to render the above verdict. To the credit of Coroner Miller and his jury, it must be said that they did their duty, and did it nobly, and their names should be emblazoned in golden letters on the pillars of fame as martyrs to science. The advocates of the arsenic theory attempted by every means in their power to prove that the poisoning was due to that substance. The fact that in arsenical poisoning the symptoms develop under an hour, and that in all seventy of these cases no symptoms came on in a single case under four hours, and in many instances were delayed to eighteen or twenty hours, was entirely lost sight of, and it was attempted to show the jury that the exception had become the rule, and from sleep, full stomachs, etc., symptoms had been delayed. None of these people went to sleep before 10 o'clock that night, and consequently that argument did not hold. Again, the reported finding of traces of arsenic by two advocates of this theory was thought by some to be conclusive, and therefore there could be no doubt of its truth. The finding of arsenic in the dejecta of his patient by means of a copper slip, where the deposit was considered sufficient evidence that

the substance was arsenic, performed with drug-store chemicals and telephone copper wire, the subsequent sending of it to a chemist who completes the sublimation, finds crystals in the sublimate, pronounces them arsenic, gives that as his opinion before the jury, knows nothing of the purity of the chemicals or the caution with which the preliminary steps of the operation were performed, is evidence most sublime. The testimony of the same chemist, who reports finding arsenic in the urine and vomited matter of patients of another doctor, can be disposed of equally as quickly. The testimony of the physician on the stand, that the bottle in which this urine was contained may have been one that contained Fowler's solution, which the patient had been taking for some other trouble, of course completely invalidates the evidence as to arsenic in the urine. With reference to the vomited matter from another patient, it is shown on the file at the drug store (April 16, 1891) that this patient was taking a prescription containing bismuth. This bismuth was the same specimen that was found in our analysis to contain traces of arsenic, and of course the bismuth was contained in the vomited matters of the patient, and would have shown in any test applied to those vomited matters for arsenic.

In support of the mushroom theory several cans of these edibles which had been opened were arrayed in an imposing manner, and the jury were regaled with statements of how mushrooms might have produced the same symptoms. This statement was met with the assertion that if the mushrooms were decomposed that the poisonous products were those of bacteria and not due to an integral poison in the mushrooms. When asked how many mushrooms it took to poison a man, the witness stated two tablespoonfuls at the least. He was then asked to explain how it was possible for the gentleman to be so poisoned who testified that he had only eaten a ham-sandwich and a cup of coffee? The answer was that some of the mushroom sauce got on the bread. It will be seen at a glance that if two tablespoonfuls of mushrooms are required to produce any poisonous symptoms whatever, that it was not possible to have the small amount of sauce on a sandwich

so concentrated as to poison a man, especially when there were only six cans used at the wedding. Witness was then asked to explain the case of Bridget Cain, who ate chicken before the mushrooms were opened, and the Eminence cases, who ate only salad, and he admitted that he could not do so.

Before closing this article I desire to state clearly and precisely my position in this matter. It has been stated by certain parties that they intended to prove that these cases were poisoned by arsenic in spite of every thing.

Every unfortunate occurrence of this kind always develops a lot of embryonic chemists and toxicologists, who are more or less persistent in forcing their opinions upon the public for the sake of the newspaper notoriety they hope it will give them, and this in face of facts and results obtained by men who have spent the greater part of their lives in work of this kind. They lament the fact that no *post-mortem* was held upon the late Mr. Guthrie, and attempt to place the blame upon the attending physicians and Coroner Miller, when to my personal knowledge these gentlemen used every means in their power to obtain an autopsy, and were only prevented by the strenuous resistance of the family and the early arrival of the undertaker. Because of this failure to obtain an autopsy on the body of Mr. Guthrie, it is argued that too long a time elapsed before the death of the others, and that all of the arsenic would have been eliminated.

I analyzed the urine and dejecta of Mrs. Guthrie on the second and third days, and if arsenic had been in her system and was being eliminated I would have detected it; if it was not undergoing elimination it would have remained in her system and I would have discovered it after death.

It is also exceedingly strange that none of the sixty-three cases of which we have records, and which have since been under close scrutiny, have developed the usual sequelæ of arsenical poisoning, that is, general emaciation, ulceration and gangrene of the skin, edema, anesthesia, and paralysis, gastralgia, dyspepsia, and chronic intestinal catarrh. Five of the cases reported before a medical society showed all the classical signs of arsenical poisoning, including such

symptoms as alopecia, inflamed and watery eyes, headache and giddiness, jaundice, eczematous eruptions, salivation, and excoriation of the tongue, angina, etc. Unfortunately, however, these symptoms occur in *chronic* arsenical poisoning, where individuals have been exposed to the fumes of arsenuretted hydrogen or have been taking arsenic for some time in small doses, and are not the usual sequelæ of acute poisoning. It will be admitted that these people were acutely poisoned; and even had they developed such symptoms it would have signified nothing, as they are just as likely to develop after ptomaine poisoning.

“With reference to the false impression that has gone abroad, that the chemists of this city were unable after thorough and careful investigation to tell the difference between mineral poison and poisons of a putrefactive nature, that this has made them the butt of ridicule by the profession in other cities, and they are getting sore and indignant over the unjust accusation. The main fact was sent abroad that ‘the jury could not agree upon a verdict.’ The truth is that the jury did agree to a man, and not one of them has yet denied that they were unanimous in their opinion that the poison was not mineral and therefore not criminal. The medical profession of Louisville are almost unanimous in the same opinion, there being only one of the city physicians who treated any of the cases who holds to the arsenic theory. There were seventy poison cases treated by twenty-one physicians. One of these physicians, who treated five of the cases, arrays himself against the other twenty physicians, who treated sixty-five cases, and declares that his five cases were poisoned by arsenic, and that he ‘can bring affidavits to prove it.’ One doctor and one chemist stand opposed to twenty doctors, the cream of the profession in this city. Every man on the jury said at the time, and says now, as does the coroner who held the investigation, that arsenic had nothing to do with the poisoning. No one undertakes to impugn the motive of the obstinate gentleman who refused to sign the official verdict in this very important matter and to stand by his expressed convictions, but it is believed that his refusal to join with the others in a verdict was prompted by reason of

‘kindness and good intentions.’” (Ed. Evening Post, June 22, 1891.) If there had been any criminal motive in this wholesale poisoning, it could not have failed to have been discovered. Having made this investigation in the interest

of science, humanity, and justice, with absolutely negative results so far as any mineral or vegetable poison is concerned, I am compelled to accept the explanation of this sad affair as already stated.